

REMARKS

Reconsideration of the pending application is respectfully requested on the basis of the following particulars.

1. In the claims

As shown in the foregoing LIST OF CURRENT CLAIMS, the claims have been amended to more clearly point out the subject matter for which protection is sought.

A. Claim amendments

Claims 1-3 are amended to recite that the rare earth oxide superconductive layer formed on the intermediate layer has a critical temperature (T_c) of 85-88° K. It is respectfully submitted that no new matter is added, since support for the amendments may be found, for example, at least on page 19, lines 16-17, page 20, lines 6-7, and page 23, line 4 of the accompanying description in the specification as originally filed.

Claims 6-8, 10, and 24 are amended to correct the minor informalities noted in the Office action. It is respectfully submitted that no new matter is added since the changes merely correct minor informalities.

Claims 12, 14, and 16 are amended to require that the rare earth oxide superconductive layer is formed on the intermediate layer by a MOD method. It is respectfully submitted that no new matter is added, since support for the amendments may be found, for example, at least on page 15, lines 4-15, page 17, lines 6-22, page 18, lines 12-14, page 20, lines 6-7, 17, and page 21, lines 9-10 of the accompanying description in the specification as originally filed.

Claims 4-5, 9, 11, 13, 15, 17-23, 25, and 26 are left unchanged.

Entry of the LIST OF CURRENT CLAIMS is respectfully requested in the next Office communication.

B. Claim objections

Reconsideration and removal of the objections of claims 6-8, 10, and 24 is respectfully requested, in view of the amendments above, on the basis that the noted informalities have been corrected.

Accordingly, removal of the objections to the claims is respectfully requested.

2. Rejection of claims 1-9, 11, 19-23, 25, and 26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 6,764,770 (*Paranthaman et al.*) in view of U.S. publication no. 2004/0157747 (*Chen et al.*)

Reconsideration of this rejection is respectfully requested on the basis that the rejection fails to establish a *prima facie* case of obviousness with respect to claims 1-3, from which the remaining claims respectively depend. In particular, it is respectfully submitted that the proposed combination of the *Paranthaman* patent and the *Chen* publication fails to disclose each and every recited element of amended claims 1-3. The remaining claims depend from either claims 1-3, and are therefore patentable as containing all of the recited elements of claims 1-3, as well as for their respective recited features.

By way of review, the embodiments of amended claims 1-3 variously recite a rare earth oxide superconductor having a metal substrate and at least one intermediate layer comprising cerium and a solid solution formation element capable of forming a solid solution with cerium and/or comprising cerium and a charge compensation element. A rare earth oxide superconductive layer is formed on the intermediate layer and has critical temperature (T_c) of 85-88° K.

While the *Paranthaman* patent discloses YBCO layers grown on substrates, by both pulsed laser deposition (PLD) and BF process (col. 5, lines 58-60), the *Paranthaman* patent is silent as to the critical temperature of the YBCO layers.

The *Paranthaman* patent does discuss the critical current density J_c of the YBCO layers at a temperature of 77° K, but fails to indicate what the critical temperature of the YBCO layers is. Even if the temperature of 77° K is considered to

be the critical temperature of the YBCO layers, this temperature clearly falls outside the range of the critical temperature (T_c) of 85-88° K recited in amended claims 1-3.

Turning to the *Chen* publication, high temperature superconductor films on metallic substrates are disclosed, including a HTS (High T_c superconducting) layer (abstract; paragraph [0005]). However, while HTS layers are disclosed, the *Chen* publication is completely silent as to what the critical temperatures T_c of the HTS layers might actually be.

Accordingly, since each of the *Paranthaman* patent and *Chen* publication fail to disclose a rare earth oxide superconductive layer formed on the intermediate layer and having critical temperature (T_c) of 85-88° K, the proposed combination of the *Paranthaman* patent and *Chen* publication fails to disclose this feature of amended claims 1-3.

Additionally, as acknowledged in the Office action on page 3, the *Paranthaman* patent does not disclose in the intermediate buffer layer cerium paired with either a solid solution formation element or a charge compensation element.

The Office action turns to the *Chen* publication in an attempt to cure this deficiency of the *Paranthaman* patent.

However, as indicated on pages 3-4 of the Office action, and as discussed in paragraph [0036] and claims 7 and 8 of the *Chen* publication, the buffer layer of the *Chen* publication includes cerium oxide doped with group 2, IIA or 2A metal oxides, transition element oxides, an lanthanide metal oxides, actinide metal oxides, or mixtures thereof.

In contrast to the embodiments of claims 1-3, the group 2, IIA or 2A metal oxides, transition element oxides, an lanthanide metal oxides, actinide metal oxides, or mixtures thereof, are all *oxides of elements*, and thus, cannot be considered to be a solid solution formation *element* or a charge compensation *element* as is required by amended claims 1-3.

Thus, even supposing that the teachings of the *Chen* publication are applied to the buffer layer of the *Paranthaman* patent, the proposed combination still fails to

disclose in the intermediate buffer layer cerium paired with either a solid solution formation *element* or a charge compensation *element* as is required by amended claims 1-3.

For at least these two reasons, it is respectfully submitted that the proposed combination of the *Paranthaman* patent and the *Chen* publication fails to disclose each and every recited element of amended claims 1-3. Accordingly, a *prima facie* case of obviousness cannot be established with respect to amended claims 1-3, and withdrawal of this rejection is respectfully requested.

As mentioned above, applicants submit that independent claims 1-3 are patentable and therefore, claims 4-9, 11, 19-23, 25, and 26, which respectively depend from claims 1-3, are also considered to be patentable as containing all of the elements of respective claims 1-3, as well as for their respective recited features.

3. Rejection of claims 10 and 24 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 6,764,770 (*Paranthaman et al.*) in view of U.S. publication no. 2004/0157747 (*Chen et al.*) and further in view of U.S. patent no. 4,959,348 (*Higashibata et al.*)

Reconsideration of this rejection is respectfully requested on the basis that the rejection fails to establish a *prima facie* case of obviousness with respect to claims 10 and 24.

The deficiencies of the *Paranthaman* patent and the *Chen* publication are discussed above in detail with respect to amended claims 2 and 3, from which claims 10 and 24 respectively depend.

It is respectfully submitted that the *Higashibata* patent fails to provide for the deficiencies of the *Paranthaman* patent and the *Chen* publication. In particular, the *Higashibata* patent fails to disclose a rare earth oxide superconductive layer formed on an intermediate layer and having critical temperature (T_c) of 85-88° K or the intermediate layer cerium paired with either a solid solution formation element or a charge compensation element, both as required by amended claims 2 and 3.

Accordingly, since the *Higashibata* patent fails to provide for the deficiencies of the *Paranthaman* patent and the *Chen* publication, a *prima facie* case of obviousness cannot be established with respect to amended claims 2 and 3, from which claims 10 and 24 respectively depend, and withdrawal of this rejection is respectfully requested.

4. Rejection of claims 12-18 under 35 U.S.C. § 103(a) as being unpatentable over U.S. patent no. 6,764,770 (*Paranthaman et al.*) in view of U.S. publication no. 2004/0157747 (*Chen et al.*) and further in view of U.S. patent no. 5,444,040 (*Kojima et al.*)

Reconsideration of this rejection is respectfully requested on the basis that the rejection fails to establish a *prima facie* case of obviousness with respect to claims 12, 14, and 16, from which the remaining claims respectively depend. In particular, it is respectfully submitted that the proposed combination of the *Paranthaman* patent, the *Chen* publication, and the *Kojima* patent fails to disclose each and every recited element of amended claims 12, 14, and 16. The remaining claims depend from either claims 12, 14, and 16, and are therefore patentable as containing all of the recited elements of claims 12, 14, and 16, as well as for their respective recited features.

The embodiments of amended claims 12, 14, and 16 pertain to methods of producing a rare earth oxide superconductor, in the vein of claims 1-3, with particular emphasis on the use of a mixed solution of organometallic acid salts of cerium and an organometallic acid salt of 1 or 2 types of a solid solution formation element or a charge compensation element. In other words, the method includes an MOD method of forming the intermediate layer using a mixed solution of naphthenates. Further, amended claims 12, 14, and 16 also require the rare earth oxide superconductive layer to be formed by a MOD method onto the intermediate layer.

The deficiencies of both the *Paranthaman* patent and the *Chen* publication are discussed above in detail. In particular, as discussed above, the *Paranthaman* patent fails to disclose a method of forming in the intermediate buffer layer cerium paired with either a solid solution formation element or a charge compensation element.

Additionally, the *Paranthaman* patent, while disclosing the YBCO layer formed by various pulsed laser deposition (PLD) or sputtering processes, fails to disclose forming the YBCO layer by MOD.

Similarly, as previously discussed, the *Chen* publication fails to disclose a method of forming in the intermediate buffer layer cerium paired with either a solid solution formation element or a charge compensation element.

Additionally, while the *Chen* publication discloses the use of MOD to form an intermediate layer (paragraphs [0019], [0040]), the *Chen* publication fails to disclose using the MOD forming method to form the HTS film.

Instead, the *Chen* publication discloses that the HTS film is formed by, for example, pulsed laser deposition (PLD) (paragraphs [0057] and [0060]) or by photo-assisted MOCVD (paragraph [0063]).

Thus, as can be seen from the above discussion, the proposed combination of the *Paranthaman* patent and the *Chen* publication fails to disclose a method of forming in the intermediate buffer layer cerium paired with either a solid solution formation element or a charge compensation element and forming by an MOD method a rare earth oxide superconductive layer on the intermediate layer, all as required by amended claims 12, 14, and 16.

The Office action acknowledges on page 6 that the proposed combination of the *Paranthaman* patent and the *Chen* publication fails to disclose a heat treatment (or calcination) step in the range of 900 to 1,200° C.

The Office action turns to the *Kojima* patent as disclosing such a step. However, even if the *Kojima* patent discloses a heat treatment (or calcination) step in the range of 900 to 1,200° C, the *Kojima* patent fails to disclose a method of forming in the intermediate buffer layer cerium paired with either a solid solution formation element or a charge compensation element and forming by an MOD method a rare earth oxide superconductive layer on the intermediate layer, all as required by amended claims 12, 14, and 16, and thus, fails to cure the deficiencies of the *Paranthaman* patent and the *Chen* publication discussed above.

Therefore, the proposed combination of the *Paranthaman* patent, the *Chen* publication, and the *Kojima* patent fails to disclose each and every recited element of amended claims 12, 14, and 16, from which claims 13, 15, 17, and 18 respectively depend. Accordingly, a *prima facie* case of obviousness cannot be established with respect to claims 12, 14, and 16, and withdrawal of this rejection is respectfully requested.

As mentioned above, applicants submit that independent claims 12, 14, and 16 are patentable and therefore, claims 13, 15, 17, and 18, which respectively depend from claims 12, 14, and 16, are also considered to be patentable as containing all of the elements of respective claims 12, 14, and 16, as well as for their respective recited features.

5. Conclusion

As a result of the amendment to the claims, and further in view of the foregoing remarks, it is respectfully submitted that the application is in condition for allowance. Accordingly, it is respectfully requested that every pending claim in the present application be allowed and the application be passed to issue.

Please charge any additional fees required or credit any overpayments in connection with this paper to Deposit Account No. 02-0200.

If any issues remain that may be resolved by a telephone or facsimile communication with the applicants' attorney, the examiner is invited to contact the undersigned at the numbers shown below.

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